

Tuesday, January 10th

- Reminder: Assignment due Wednesday
(**correction for #1)
- Look at the last type of equation (General Form)
- Notes/Examples
- Practice questions

Extra help offered at lunch hour Tuesday and Thursday

6.6 General Form of the Equation for a Linear Relation

LESSON FOCUS

Relate the graph of a linear function to its equation in general form.

Make Connections

A softball team may field any combination of 9 female and male players. There must be at least one female and one male on the field at any time. What are the possible combinations for female and male players on the field?



General Form of the Equation of a Linear Relation

$Ax + By + C = 0$ is the general form of the equation of a line, where A is a whole number, and B and C are integers.

↳ No negatives, decimals/fractions

$B + C$

↳ positive/negative, but no fractions.

* Example 1 Rewriting an Equation in General Form

Write each equation in general form.

* a) $y = \left(-\frac{2}{3}x + 4\right) \cdot 3$

$$3y = -2x + 12$$

$$3y - 12 = -2x$$

$$2x + 3y - 12 = 0$$

(-1)

b) $y - 1 = \frac{3}{5}(x + 2)$

$$5 \cdot (y - 1) = \left(\frac{3}{5}x + \frac{6}{5}\right) \cdot 5$$

$$5y - 5 = 3x + 6$$

$$5y - 11 = 3x$$

$$(-3x + 5y - 11) = (0)$$



6.6 General Form of the Equation for a Linear Relation

$$3x - 5y + 11 = 0$$

Example 1 Rewriting an Equation in General Form

Write each equation in general form.

a) $y = -\frac{2}{3}x + 4$ b) $y - 1 = \frac{3}{5}(x + 2)$

SOLUTION

a) $y = -\frac{2}{3}x + 4$ Multiply each side by 3.

$3y = 3\left(-\frac{2}{3}x + 4\right)$ Remove the brackets.

$3y = 3\left(-\frac{2}{3}x\right) + 3(4)$

$3y = -2x + 12$ Collect all the terms on the left side of the equation.

$2x + 3y - 12 = 0$ This is the general form of the equation.

(Solution continues.)

Example 1 Rewriting an Equation in General Form

b) $y - 1 = \frac{3}{5}(x + 2)$

Multiply each side by 5.

$$5(y - 1) = 5\left(\frac{3}{5}\right)(x + 2)$$

Remove the brackets.

$$5y - 5 = 3(x + 2)$$

$$5y - 5 = 3x + 6$$

Collect like terms.

$$5y = 3x + 11$$

Collect all the terms on the right side of the equation.

$$0 = 3x - 5y + 11$$

The general form of the equation is: $3x - 5y + 11 = 0$



CHECK YOUR UNDERSTANDING



Example 2 Graphing a Line in General Form

- a) Determine the x - and y -intercepts of the line whose equation is: $3x + 2y - 18 = 0$



6.6 General Form of the Equation for a Linear Relation



SOLUTION

- c) Verify that the graph is correct.

Example 2**Graphing a Line in General Form**

- a) Determine the x - and y -intercepts of the line whose equation is: $3x + 2y - 18 = 0$

x -int
($y=0$)

$$3x + 2(0) - 18 = 0 \quad \text{solve for } x$$

$$3x - 18 = 0$$

$$3x = 18 \quad x = 6$$

(6, 0)

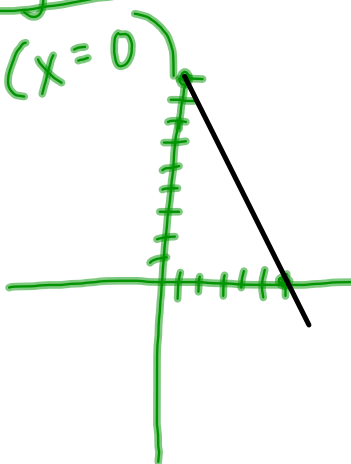
y -int
($x=0$)

$$3(0) + 2y - 18 = 0 \quad \text{solve for } y$$

$$2y - 18 = 0$$

$$2y = 18$$

$y = 9$ (0, 9)



Example 3**Determining the Slope of a Line Given Its Equation in General Form**

Determine the slope of the line with this equation:

$$3x - 2y - 16 = 0$$

change into slope-intercept form ($y = mx + b$)
 $+16$ $+16$

$$3x - 2y = 16$$

$$\begin{array}{r} -3x \\ -3x \\ \hline -2y = -3x + 16 \\ \hline \end{array}$$

$$y = \frac{3}{2}x - 8$$

↑
slope

6.6 General Form of the Equation for a Linear Relation

**SOLUTION**

Wednesday, January 11th

- Reminder: Assignment due today
- Review the General form of the linear equation
- Practice questions
- Classwork/Homework
- Begin Last Unit! Systems of Equations

Extra help offered at lunch hour Tuesday and Thursday



CHECK YOUR UNDERSTANDING

1. Write each equation in general form.

a) $y = \left(-\frac{1}{4}x + 3\right) \cdot 4$

b) $y + 2 = \frac{3}{2}(x - 4)$



$$\begin{aligned} 4y &= -1x + 12 \\ -12 \\ 4y - 12 &= -1x \\ +x &+x \\ \boxed{x + 4y - 12 = 0} \end{aligned}$$

$$b) y + 2 = \frac{3}{2}(x - 4)$$

$$2 \cdot (y + 2) = \left(\frac{3x}{2} - 6 \right) \cdot 2$$

$$2y + 4 = 3x - 12$$

$$2y + 16 = 3x$$

$$(-1) \cdot (-3x + 2y + 16) = (0) \cdot (-1)$$

$$3x - 2y - 16 = 0$$

2. a) Determine the x- and y-intercepts of the line whose equation is:

$$x + 3y + 9 = 0$$

x-int

$$x + 3(0) + 9 = 0$$

$$x + 9 = 0$$

$$x = -9$$

$(-9, 0)$

- b) Graph the line.

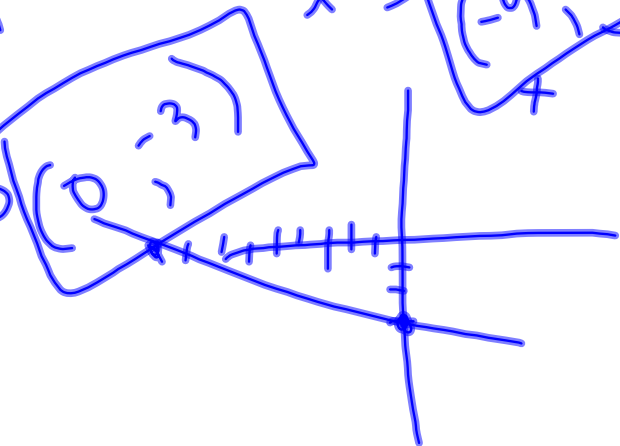
y-int ($x=0$)

$$0 + 3y + 9 = 0$$

$$3y = -9$$

$$y = -3$$

$(0, -3)$





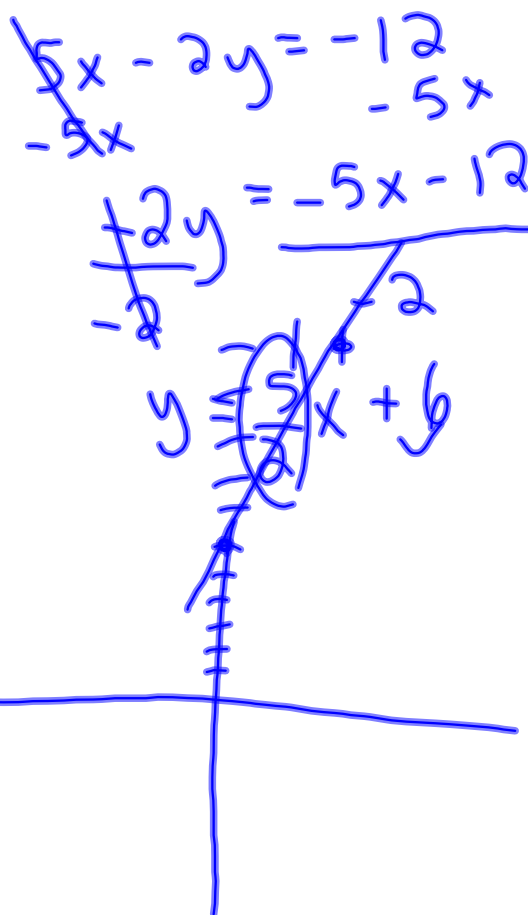
CHECK YOUR UNDERSTANDING

3. Determine the slope of the line with this equation:

$5x - 2y + 12 = 0$



$y = mx + b$
↑
slope



slope = $\frac{5}{2}$
y.int = +6

$\frac{\text{rise}}{\text{run}}$

Thursday, January 12th

- Reminder: Assignment was due yesterday
- Go over yesterday's homework
- Begin Last Unit! Systems of Equations
- Notes/Examples
- Practice Questions

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Classwork/ Homework

Page 384 #4bcd, 6a, 12a, 13a, 14a

3 forms

① Slope-intercept $y = mx + b$

② Slope-point $y - y_1 = m(x - x_1)$

③ General form $Ax + By + C = 0$

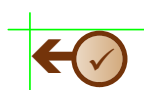
4. In which form is each equation written?

a) ~~$8x - 3y = 52$~~

b) $9x + 4y + 21 = 0$ G

c) $y = 4x + 7$ S-I

d) $y - 3 = 5(x + 7)$ S-P



6.6 General Form of the Equation for a Linear Relation

6. Write each equation in general form.

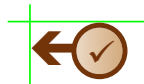
c) $y = -2x + 6$

b) $2x - y = 7$

d) $y = 5x - 1$

a) $4x + 3y = 36$
 $-36 \quad -36$

$$4x + 3y - 36 = 0$$



12. Write each equation in slope-intercept form.

b) $3x - 8y + 12 = 0$

c) $2x - 5y - 15 = 0$

d) $7x + 3y + 10 = 0$

a) $4x + 3y - 24 = 0$
 $-4x$ $-4x$

$3y - 24 = -4x$
 $+24$ $+24$

$y = \frac{-4x + 24}{3}$

$y = mx + b$



$y = -\frac{4}{3}x + 8$
 \uparrow \uparrow
 m $y\text{-int}$

6.6 General Form of the Equation for a Linear Relation

13. Determine the slope of the line with each equation.
Which strategy did you use each time?

b) $3x - y + 33 = 0$
c) $5x - y + 45 = 0$ d) $10x + 2y - 16 = 0$

$$y = mx + b$$

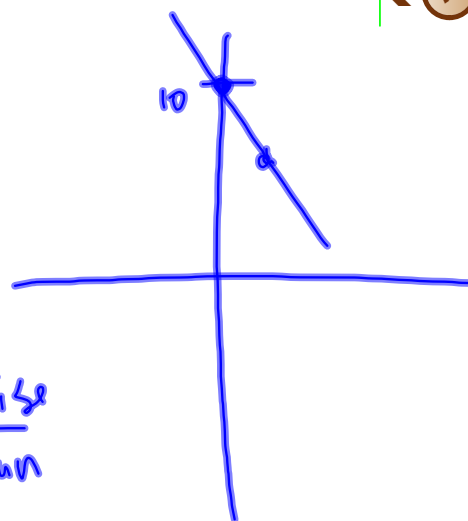


a) $4x + \underline{y} - 10 = 0$
 $-4x$ $+10$

$$y = -4x + 10$$

↑
slope

$\frac{-4}{1}$ $\frac{\text{rise}}{\text{run}}$



6.6 General Form of the Equation for a Linear Relation

14. Graph each equation on grid paper.

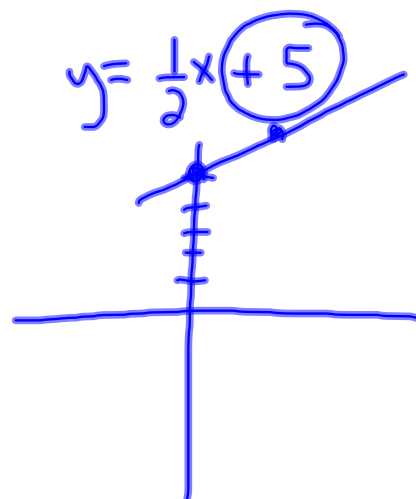
Which strategy did you use each time?

- b) $2x + 3y - 15 = 0$
c) $7x + 4y + 4 = 0$ d) $6x - 10y + 15 = 0$

a) $x - 2y + 10 = 0$

$$-x \leq -10$$

$$\frac{1}{2}y = \frac{-x - 10}{-2}$$



6.6 General Form of the Equation for a Linear Relation

$$y - 2 = 3(x + 5)$$

Slope-Point

slope = 3

Point = $(-5, 2)$
(x, y)

$$\text{slope} = \frac{1}{2}$$

$$\text{Point } (6, -3)$$

x_1, y_1

$$y - y_1 = m(x - x_1)$$

slope
Point

$$y - -3 = \frac{1}{2}(x - 6)$$

$$y + 3 = \frac{1}{2}(x - 6)$$

① Slope $\frac{\text{rise}}{\text{run}}$ or $m = \frac{y_2 - y_1}{x_2 - x_1}$

② Intercepts

③ 3 Forms of linear eqn

(a) Slope - Intercept
 $y = mx + b$
↑ slope ↑ y-intercept

(b) Slope - Point $y - y_1 = m(x - x_1)$
↑ slope Point (x_1, y_1)

(c) General form

$$Ax + By + C = 0$$

-no fractions

-A can't be negative